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Comparative Analysis Between Cost and Bureaucracy – Sensitivity Method

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Abstract

This paper is about the comparison of cost and bureaucracy in the tax system. The results show that the bureaucracy decreases the tax revenue and the same result is with the costs. The applied methodology is based on the S.M. (Sensitivity Method) where the comparison between the cost and the bureaucracy happens through graphical analysis. The mathematical background and the theory of the money cycle specify the behavior of these variables. The objective of this work is to reveal the interaction between these variables. The scope of the paper is to confirm the behavior of the theory of the Cycle of Money considering these variables.

Keywords: cycle of money, sensitivity method, cost, bureaucracy.

1. Introduction

The money cycle counteracts the variables of the bureaucracy and the cost. The quantification analysis of the sensitivity of the tax system to the cost and bureaucracy is done by the application of the S.M. (Sensitivity Method) (Bergh, 2009; Bourdin & Nadou, 2018; Challoumis, 2020d, 2020a, 2021d; Corti et al., 2020; Ginsburgh & Weber, 2020; Levi, 2021; Ortun et al., 2017; Paes-Sousa et al., 2019; Rumayya et al., 2020; Tvaronavičienė et al., 2018; Urwannachotima et al., 2020; Woody & Viney, 2017; Παπακωνσταντίνου et al., 2013). The background of this method stands on the behavior analysis of mathematical equations. According to bibliography (Challoumis, 2018a, 2018b, 2023g, 2023b, 2023a, 2023i, 2023c, 2023j, 2023k, 2023d, 2023l, 2023e, 2020a, 2023m, 2023o, 2024b, 2024c, 2024a, 2020b, 2021b, 2021a, 2022a, 2022b, 2023h, 2023f). The cycle of money is the theory where the Q.E. method and also the Sensitivity method have been applied (Aitken, 2019; Arai et al., 2018; Biernaski & Silva, 2018; Buonomo et al., 2020; Challoumis, 2018c; Diallo et al., 2021; Fernandez & Raine, 2019; Hasselman & Stoker, 2017; Hyeon Sik Seo & YoungJun Kim, 2020; Kananen, 2012; Khadzhyradieva et al., 2019; Kroth et al., 2020; Leckel et al., 2020; Loayza & Pennings, 2020; Montenegro Martínez et al., 2020; Nielsen et al., 2019; Ruiz et al., 2017; Scholvin & Malamud, 2020; Soboleva I.V., 2019; Syukur, 2020; Taub, 2015; Ustinovich & Kulikov,

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2020; Watanabe et al., 2018). The Sensitivity Method is based on the concept of how sensitive is a variable. To achieve this there are two steps:

- It should be defined as the equation that is under examination, according to the applied theory.
- Following the same concept of the Q.E. method it is the case that one variable is there in the one case, and the other case is omitted. The basic difference between the Sensitivity Method to the Q.E. method is that Sensitivity does not use the generator, to produce random values, but there is each time a condition that should be satisfied.

The S.M. (Sensitivity Method) is plausible to be applied using a combination of mathematics and programming (Challoumis, 2018c, 2021i, 2022c, 2023p, 2023n, 2023q, 2023r, 2023u, 2023t, 2023s, 2024e, 2024d, 2021j, 2021e, 2021c, 2021d, 2021g, 2021h, 2021f, 2022d; Challoumis & Savic, 2024). The quantification of quality data is the concept of the S.M. (the same happens with the Q.E. method, but from a different point of view (Aakre & Rübbelke, 2010; Baker et al., 2020; Blundell & Preston, 2019; Bowling et al., 2019; Brownell & Frieden, 2009; J. N. B. Campos, 2015; Carattini et al., 2018; Díaz et al., 2020; Fan et al., 2020; Fronzaglia et al., 2019; Gocekli & Comertler, 2021; Grabs et al., 2020; Hai, 2016; Liu et al., 2018; Maestre-Andrés et al., 2019; Marques, 2019; OECD, 2017, 2020; Persson & Tinghög, 2020; Silva et al., 2020; TUTER, 2020; Wright et al., 2017).” Then, it is plausible to quantify quality data. In our analysis, this method is used for clarification of the behavior of the impact factor of the global tax revenue.

2. Literature review

The impact factor of tax revenues of countries which are tax heaves, s according to the bibliography (Challoumis, 2018c, 2021j, 2022c, 2023p, 2023n, 2023q, 2023r, 2023u, 2023t, 2023s, 2024e, 2024d, 2021c, 2024f, 2024g, 2021e, 2021i, 2021d, 2021g, 2021h, 2021f, 2022d; Challoumis & Savic, 2024). It is determined as that:

$$s = \frac{k+l}{r+c+t+i} \quad (1)$$

“Therefore, are countries that receive the products that are taxed in different countries. This allocation of profits between profits and losses permits the enterprises that participate in controlled transactions of the transfer pricing activities to maximize their utility. But, contemporaneously the tax revenue from a global view has declined. Then, the loss of tax income from some countries is more than the profits that make the countries which are tax havens. Thereupon, the symbol of s the impact factor of tax revenue from a global view, and there are some coefficients which are $k, l, r, t,$ and c. Thus, the symbol of k is about the impact factor of capital, l is the impact factor about the liability of the authorities on the tax system. The interpretation of the liability is about how unbalanced it is the tax system. The parameter of r is about the risk, the t is about how much trustworthy is the tax system from the view of cost (Arabyan, 2016; Arbel et al., 2019; Camous & Gimber, 2018; J. Campos et al., 2019; Chubarova et al., 2020; de A. Dantas et al., 2018; de Vasconcelos et al., 2019; Farah, 2011; Goldsztejn et al., 2020b, 2020a; Hartz & John, 2009; Herrington, 2015; Islam et al., 2020; Jia et al., 2020; Kartini et al., 2019; Lajas & Macário, 2020; Martinez & Rodríguez, 2020; Marume, 2016; Nash et al., 2017;

Noland, 2020; Peres et al., 2020; Torres & Riaño-Casallas, 2018; Tummers, 2019). The i is about the requirements of the intangibles (different relation from the intangibles which are proportional to capital). The symbols with the "~" are accordingly the same thing but from the view of the uncontrolled transactions. Thus, the numerator is proportional to the income of taxes, as the investments and the stable tax environments, with a lack of cost enhance the tax income (Acs et al., 2016; Adhikari et al., 2006; Andriansyah et al., 2019; Kanthak & Spies, 2018; Korenik & Wegrzyn, 2020; Kreft & Sobel, 2005; Ladvocat & Lucas, 2019; Nayak, 2019; Ud Din et al., 2016). On the other hand, the denominator is inverting proportional to the tax income, as the risk, the cost, and the unbalance of taxation cause less tax income. Moreover, for $\tilde{s}$:

$$\tilde{s} = \frac{\tilde{k}+\tilde{l}}{\tilde{r}+\tilde{c}+\tilde{t}+\tilde{i}} \quad (2)$$

It is determined the aggregate impact factor of tax revenues, which is symbolized by $\hat{s}$, and is defined by the next equation:

$$\hat{s} = s + \tilde{s} \quad (3)$$

Based on the prior equations it is plausible to proceed to the identification of the behavior of the impact factors of tax revenues in the case of tax heavens and the case of the non-tax heavens. Then, s is a factor that allows the comparison between the controlled with the uncontrolled transactions. Thence is plausible to have a standalone behavior analysis of controlled transactions and a combined behavior analysis between the controlled transactions with the uncontrolled transactions. The next section analyzes the impact factor of tax revenues with the rest impact factors."

This methodology is illustrated below:

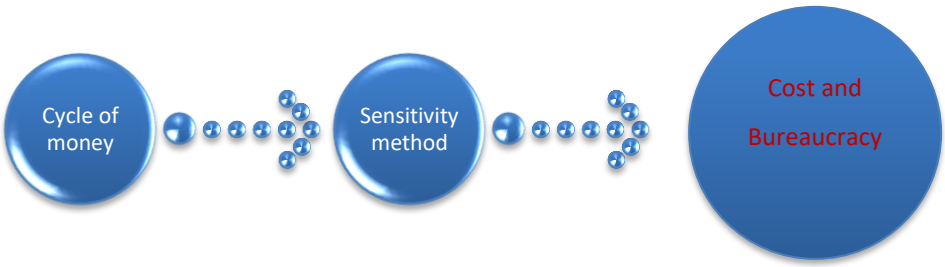

Figure 1. S.M. (Sensitivity Method)

The previous scheme followed the Sensitivity Method to determine the behavior of the global tax revenue in the case that the existence of the cost and the ideal case that this factor is avoided.

3. Results

The cost is in interaction with the impact factor of tax revenues. In this behavioral analysis is determined the model which clarifies the behavior of the impact factor of tax revenues with the existence and with the avoidance of the impact factor of tax sensibility (Challoumis, 2018e, 2018d, 2022e, 2023y, 2023x, 2023w, 2023v, 2023z, 2024h, 2024l, 2024m, 2024j, 2019e, 2024k, 2019a, 2019d, 2019c, 2019b, 2020d, 2020c, 2021k). Then, for the application of the Sensitivity Method:

$$t > l > i > r > k > c \quad (4)$$

Therefore, it is plausible to proceed to a quantity analysis using equations (1), (2), and (4). Therefore, applying the Sensitivity method and choosing the appropriate magnitudes for the coefficient:

Table 1. Compiling coefficients

Factors	Values of s	Values of s'
k	0,4	0,4
i	0.6	0.6
l	0.7	0.7
r	0.5	0.5
c	0.3	-
t	0.8	-
fs	<0.3	<0.3
f_i	<0.3	<0.3

The prior table presents the data that are under examination to be able to compile the model and confirm that the impact factor of cost declines the tax revenue (Challoumis, 2018e, 2018f, 2020d, 2020c, 2021k, 2023v, 2023y, 2023x, 2023aa, 2023ab, 2023ah, 2023ad, 2018d, 2023w, 2023z, 2023ae, 2023af, 2023ag, 2023ac, 2024m, 2024k, 2024h, 2024j, 2019b, 2024l, 2024n, 20240, 2024p, 2019f, 2019d, 2019e, 2019a, 2019g, 2019c).

Therefore, using the Sensitivity Method:

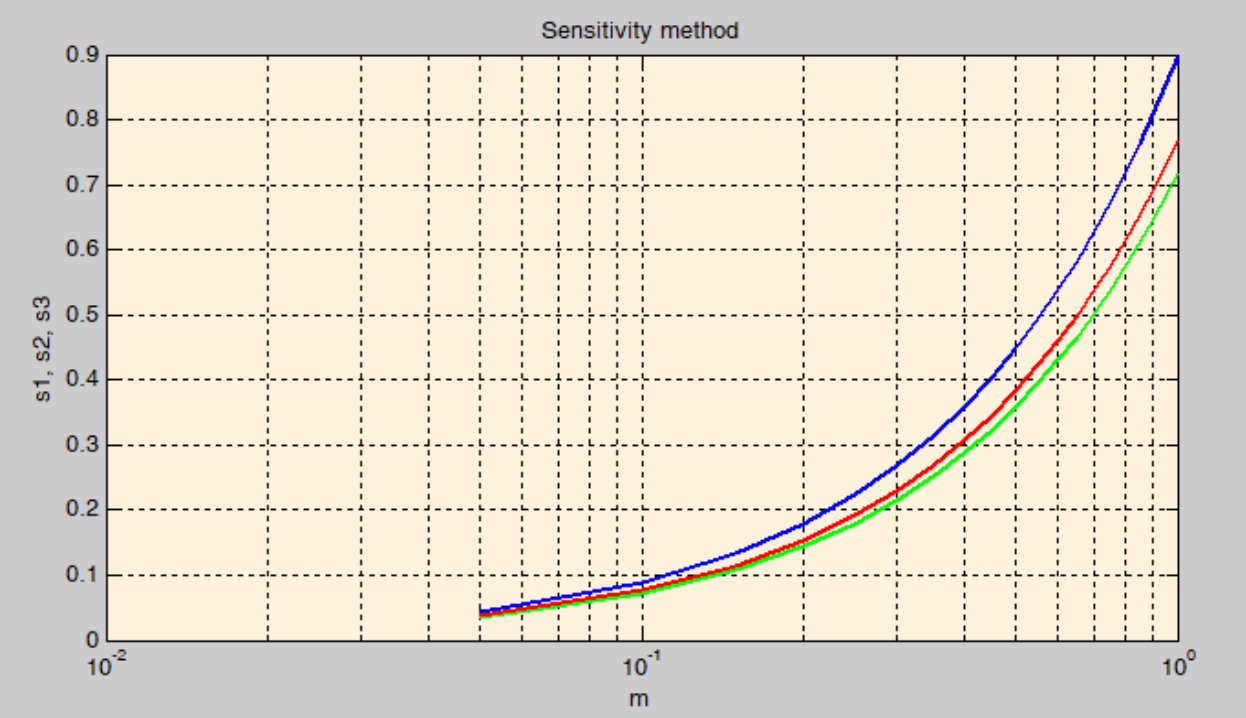

Figure 3. Application of S.M.

In logarithmic forms, the red line is about the case that there doesn't exist cost, and the blue line is the case that there does exist bureaucracy. The green line is the case

that there are all the variables. It is confirmed by the theoretical background of the theory of the money cycle (or the theory of the cycle of money).

4. Conclusions

This paper examined the case of cost and bureaucracy and how interact with global tax revenue. Then the companies that participate in controlled transactions prefer as expected the tax environments that have unstable law rules and insecure economies. This has an impact on the companies that participate in controlled transactions to be increased in numbers because that way can allocate their profits and losses better. Then, the decrease in cost could rapidly increase the tax revenue. Simultaneously the decrease of bureaucracy increases the tax revenue. Then, the decrease in bureaucracy and cost leads to an ideal case for the money cycle.

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Appendix

```
% Sensitivity Plot of Cycle of money (C)(R)2024 Constantinos Challoumis
m=0:0.05:1;
k=0.4*m;
l=0.7*m;
j=0.6*m;
r=0.5*m;
c=0.3*m;
t=0.8*m;
w=r+c+t+j;
p=r+c+j;
q=r+t+j;
s1=k+l/w*m;
s2=k+l/p*m;%the multiplication is made to avoid constant by the division
s3=k+l/q*m;
i=0;

plot(m,s1,'green',m,s2,'blue',m,s3,'red')
grid on
title('Sensitivity method')
xlabel('m')
ylabel('s1, s2, s3')

while (s1(i)>s1(i+1))
   i=i+1;
end

m(i)
s1(i)
```

C O A S